PATENT APPLICATION

79123-1114 PATENT

PATTERN FORMER FOR WRAPPED BAKERY PRODUCTS

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PATTERN FORMER FOR WRAPPED BAKERY PRODUCTS

TECHNICAL FIELD

This invention relates generally to pattern formers for bakery products, and more particularly to apparatus for assembling wrapped bakery products into predetermined patterns prior to the loading thereof into bakery trays.

BACKGROUND AND SUMMARY OF THE INVENTION

The operation of a modern commercial bakery in the manufacture of bakery products such as sliced bread loaves begins with the preparation of dough which is deposited into baking pans, proofed, and baked. Thereafter, the baked loaves of bread are removed from the pans, cooled, sliced, wrapped in plastic film, and loaded into bakery trays for delivery to retail outlets.

As is well known, bread and other wrapped bakery products such as hamburger buns, hot dog buns, etc. are available in a seemingly infinite number of sizes. However, commercial bakeries do not typically provide bakery trays which are configured to receive particular bakery products. Rather, commercial bakeries typically employ one type, or at most a few types, of bakery trays which are used to receive and transport a wide variety of bakery products.

Prior to being loaded into bakery trays, bakery products are arranged in predetermined patterns, the purpose being to assure the most efficient loading of a particular tray configuration with a particular bakery product to be received therein. In addition to loading efficiency, the positioning of the tails of the wrapped bakery products, that is, the openable ends thereof which are tied or otherwise secured during transport, is also taken into consideration. Preferably, the tails of the

wrapped bakery products face inwardly thereby preventing snagging or tearing during transport.

The apparatus that is used to arrange wrapped bakery products in predetermined patterns prior to the loading thereof into bakery trays is known as a pattern former. Typically, a pattern former receives individual wrapped bakery products from the wrapping apparatus, arranges the received wrapped bakery products in groups comprising between 1 and about 6 wrapped bakery products, assembles at least 2 and as many as several groups of wrapped bakery products relative to one another to form the predetermined pattern, then positions the entire pattern of wrapped bakery products in a bakery tray for transport.

U.S. patent number 4,522,292 granted to Euverard, et al. on June 11, 1985; U.S. patent number 4,856,263 granted to Schneider, et al. on August 15, 1989; and U.S. patent number 5,317,859 granted to Schneider, et al. on June 7, 1994 illustrate and describe prior art pattern formers. The pattern formers of the prior art are relatively complex in design and are therefore costly to purchase and maintain. Perhaps more importantly, prior art pattern formers are relatively slow in operation, achieving the maximum rate of about 60 loaves per minute. This means that several of the prior art pattern formers are required in order to fill bakery trays with wrapped bakery products

at a rate that is compatible with the output of a typical bakery product wrapping apparatus.

The present invention comprises an improved pattern former for wrapped bakery products which overcomes the foregoing and other deficiencies which have long since characterized the prior art. In particular, the pattern former of the present invention has an operational speed of 100 loaves per minutes which means that a significantly smaller number of pattern formers is required in order to fulfill the pattern forming requirements of the modern commercial baking operation. This results in substantial savings to the bakery operator both in terms of initial cost and in terms of maintenance requirements.

The use of pattern formers incorporating the present invention is also advantageous in that pattern formers constructed in accordance with the invention are adapted to receive wrapped bakery products along the same axis and from the same bakery product inputting devices that have been used to supply pattern formers of the prior art, and to deliver filled bakery trays along the same axis and to the same bakery tray receiving apparatus that has been used with prior art pattern formers. This means that the pattern former of the present invention can be installed in an existing bakery without reconfiguring the bakery and without repositioning the apparatus which deliver wrapped

bakery products to and receive filled bakery trays from the pattern former.

More particularly, the pattern former of the present invention employs a vacuum turntable to receive groups of wrapped bakery products and to assemble the groups of wrapped bakery products into patterns. The use of the vacuum turntable of the present invention is advantageous in that by means thereof wrapped bakery products are received and accurately position within predetermined patterns without damage either to the bakery products or the wrapping thereof.

The pattern former of the present invention further includes apparatus for transferring groups of wrapped bakery products onto the vacuum turntable while simultaneously assembling a second group of wrapped bakery products. A similar apparatus transfers patterns of wrapped bakery products into bakery trays while a subsequent pattern is simultaneously being formed. As will be appreciated by those skilled in the art, the ability of the pattern former of the present invention to perform multiple tasks simultaneously significantly increases the throughput rate of the pattern former.

BRIEF DESCRIPTION OF THE DRAWINGS

A more complete understanding of the invention may be had by reference to the following Detailed Description when taken in conjunction with the accompanying Drawings, wherein:

FIGURE 1 is a perspective view of a pattern former incorporating the invention;

FIGURE 2 is a top view of the pattern former of FIGURE 1;

FIGURE 3 is an enlargement of a portion of FIGURE 2;

FIGURE 4 is a side view of the pattern former of FIGURE 1;

FIGURE 5 is a perspective view illustrating the vacuum turntable and the apparatus for filling bakery trays with patterns of wrapped bakery products comprising the pattern former of FIGURE 1;

FIGURE 6 is an end view of the apparatus of FIGURE 5;

FIGURE 7 is a front perspective view of the apparatus for transferring patterns of wrapped bakery products into bakery trays comprising the pattern former of FIGURE 1;

FIGURE 8 is a rear perspective view of the apparatus of FIGURE 7;

FIGURE 9 is an enlargement of a portion of FIGURE 8;

FIGURE 10 is a bottom perspective view of a portion of the apparatus of FIGURE 8;

FIGURE 11 is an enlargement of a portion of FIGURE 7;

FIGURE 12 is an illustration of an initial step in the operation of the apparatus shown in FIGURES 5-11;

FIGURE 13 is an illustration of a subsequent step in the operation of the apparatus shown in FIGURES 5-11;

FIGURE 14 is an illustration of a subsequent step in the operation of the apparatus shown in FIGURES 5-11;

FIGURE 15 is an illustration of a subsequent step in the operation of the apparatus shown in FIGURES 5-11;

FIGURE 16 is an illustration of a subsequent step in the operation of the apparatus shown in FIGURES 5-11;

FIGURE 17 is an illustration of a subsequent step in the operation of the apparatus shown in FIGURES 5-11;

FIGURE 18 is an illustration of a subsequent step in the operation of the apparatus shown in FIGURES 5-11;

FIGURE 19 is an illustration of a subsequent step in the operation of the apparatus shown in FIGURES 5-11;

FIGURE 20 is an illustration of a subsequent step in the operation of the apparatus shown in FIGURES 5-11;

FIGURE 21 is an illustration of a subsequent step in the operation of the apparatus shown in FIGURES 5-11;

FIGURE 22 is an illustration of a subsequent step in the operation of the apparatus shown in FIGURES 5-11;

FIGURE 23 is an illustration of a subsequent step in the operation of the apparatus shown in FIGURES 5-11;

FIGURE 24 is an illustration of a subsequent step in the operation of the apparatus shown in FIGURES 5-11;

FIGURE 25 is an illustration of a subsequent step in the operation of the apparatus shown in FIGURES 5-11;

FIGURE 26 is an illustration of a subsequent step in the operation of the apparatus shown in FIGURES 5-11;

FIGURE 27 is an illustration of a subsequent step in the operation of the apparatus shown in FIGURES 5-11;

FIGURE 28 is an illustration of a subsequent step in the operation of the apparatus shown in FIGURES 5-11;

FIGURE 29 is an illustration of a subsequent step in the operation of the apparatus shown in FIGURES 5-11;

FIGURE 30 is an illustration of a subsequent step in the operation of the apparatus shown in FIGURES 5-11;

FIGURE 31 is an illustration of a subsequent step in the operation of the apparatus shown in FIGURES 5-11;

FIGURE 32 is an illustration of a subsequent step in the operation of the apparatus shown in FIGURES 5-11;

FIGURE 33 is an illustration of a subsequent step in the operation of the apparatus shown in FIGURES 5-11;

FIGURE 34 is an illustration of a subsequent step in the operation of the apparatus shown in FIGURES 5-11;

FIGURE 35 is an illustration of a subsequent step in the operation of the apparatus shown in FIGURES 5-11;

FIGURE 36 is an illustration of a subsequent step in the operation of the apparatus shown in FIGURES 5-11;

FIGURE 37 is an illustration of a subsequent step in the operation of the apparatus shown in FIGURES 5-11;

FIGURE 38 is an illustration of a subsequent step in the operation of the apparatus shown in FIGURES 5-11;

FIGURE 39 is an illustration of a subsequent step in the operation of the apparatus shown in FIGURES 5-11;

FIGURE 40 is an illustration of a subsequent step in the operation of the apparatus shown in FIGURES 5-11;

FIGURE 41 is an illustration of a subsequent step in the operation of the apparatus shown in FIGURES 5-11;

FIGURE 42 is an illustration of a subsequent step in the operation of the apparatus shown in FIGURES 5-11;

FIGURE 43 is an illustration of a subsequent step in the operation of the apparatus shown in FIGURES 5-11;

FIGURE 44 is an illustration of a subsequent step in the operation of the apparatus shown in FIGURES 5-11;

FIGURE 45 is an illustration of a subsequent step in the operation of the apparatus shown in FIGURES 5-11;

FIGURE 46 is an illustration of a subsequent step in the operation of the apparatus shown in FIGURES 5-11;

FIGURE 47 is an illustration of a subsequent step in the operation of the apparatus shown in FIGURES 5-11;

FIGURE 48 is an illustration of a subsequent step in the operation of the apparatus shown in FIGURES 5-11;

FIGURE 49 is an illustration of a subsequent step in the operation of the apparatus shown in FIGURES 5-11;

FIGURE 50 is an illustration of a subsequent step in the operation of the apparatus shown in FIGURES 5-11;

FIGURE 51 is an illustration of a subsequent step in the operation of the apparatus shown in FIGURES 5-11;

FIGURE 52 is an illustration of a subsequent step in the operation of the apparatus shown in FIGURES 5-11;

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FIGURE 54 is an illustration of a subsequent step in the operation of the apparatus shown in FIGURES 5-11;

FIGURE 55 is an illustration of a subsequent step in the operation of the apparatus shown in FIGURES 5-11;

FIGURE 56 is an illustration of a subsequent step in the operation of the apparatus shown in FIGURES 5-11;

FIGURE 57 is an illustration of a subsequent step in the operation of the apparatus shown in FIGURES 5-11;

FIGURE 58 is an illustration of a subsequent step in the operation of the apparatus shown in FIGURES 5-11;

FIGURE 59 is an illustration of a subsequent step in the operation of the apparatus shown in FIGURES 5-11;

FIGURE 60 is an illustration of a subsequent step in the operation of the apparatus shown in FIGURES 5-11;

FIGURE 61 is an illustration of a subsequent step in the operation of the apparatus shown in FIGURES 5-11;

FIGURE 62 is an illustration of a subsequent step in the operation of the apparatus shown in FIGURES 5-11;

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FIGURE 64 is an illustration of a subsequent step in the operation of the apparatus shown in FIGURES 5-11;

FIGURE 65 is an illustration of a subsequent step in the operation of the apparatus shown in FIGURES 5-11;

FIGURE 66 is an illustration of a subsequent step in the operation of the apparatus shown in FIGURES 5-11;

FIGURE 67 is an illustration of a subsequent step in the operation of the apparatus shown in FIGURES 5-11;

FIGURE 68 is an illustration of a subsequent step in the operation of the apparatus shown in FIGURES 5-11;

FIGURE 69 is an illustration of a subsequent step in the operation of the apparatus shown in FIGURES 5-11;

FIGURE 70 is an illustration of a subsequent step in the operation of the apparatus shown in FIGURES 5-11;

FIGURE 71 is an illustration of a subsequent step in the operation of the apparatus shown in FIGURES 5-11;

FIGURE 72 is an illustration of a subsequent step in the operation of the apparatus shown in FIGURES 5-11;

FIGURE 73 is an illustration of a subsequent step in the operation of the apparatus shown in FIGURES 5-11;

FIGURE 74 is an illustration of a subsequent step in the operation of the apparatus shown in FIGURES 5-11;

FIGURE 75 is an illustration of a subsequent step in the operation of the apparatus shown in FIGURES 5-11;

FIGURE 76 is an illustration of a subsequent step in the operation of the apparatus shown in FIGURES 5-11;

FIGURE 77 is an illustration of a subsequent step in the operation of the apparatus shown in FIGURES 5-11;

FIGURE 78 is an illustration of a subsequent step in the operation of the apparatus shown in FIGURES 5-11; and

FIGURE 79 is an illustration of a subsequent step in the operation of the apparatus shown in FIGURES 5-11.

DETAILED DESCRIPTION

Referring now to the Drawings, and particularly to FIGURE 1, there is shown a pattern former 100 incorporating the present invention. The pattern former 100 includes a frame 102 which supports the various component parts of the pattern former. The frame 102 is conventional in design and may comprise lengths of tubular, channel, or bar stock which are secured together by welding or by means of conventional fasteners.

The pattern former 100 includes an intake conveyor 104 which receives wrapped bakery products from a conventional wrapped bakery product inputting apparatus such as the delivery conveyor of a bakery product wrapping apparatus. A gating conveyor 106 receives wrapped bakery products from the intake conveyor 104 and delivers wrapped bakery products to a grouping apparatus 108. The intake conveyor 104, the gating conveyor 106, and the grouping apparatus 108 function to arrange wrapped bakery products received by the pattern former 100 in groups of wrapped bakery products, each group comprising from between 1 to about 6 wrapped bakery products depending on the particular pattern of wrapped bakery products to be formed.

The pattern former 100 further includes a transfer apparatus 110 which transfer groups of wrapped bakery products from the grouping conveyor 108 onto a vacuum turntable 112. An important feature of the present

invention comprises the fact that the transfer apparatus 100 is adapted to transfer a first group of wrapped bakery products to the vacuum turntable 112 while a subsequent group of wrapped bakery products is being arranged on the grouping apparatus 108. The ability of the pattern former of the present invention to perform these two functions simultaneously comprises a significant improvement over the prior art which results in the pattern former of the present invention having a significantly improved throughput rate when compared with prior art pattern formers.

The vacuum turntable 112 functions to receive groups of wrapped bakery products from the transfer apparatus 110 and to assemble the groups of wrapped bakery products into predetermined patterns. After a predetermined pattern of wrapped bakery products is formed, a transfer apparatus 116 transfers the pattern of wrapped bakery products from the vacuum turntable 112 to a bakery tray.

An important feature of the present invention comprises the fact that the transfer apparatus 116 is adapted to transfer a pattern of wrapped bakery products from the vacuum turntable 112 to a bakery tray while a subsequent pattern of wrapped bakery products is being assembled on the turntable 112. The ability of the pattern former of the present invention to perform these two functions simultaneously comprises a significant improvement in that it substantially increases the

throughput rate of the pattern former of the present invention when compared with prior art pattern formers.

Vacuum is applied to the vacuum turntable 112 by a vacuum generating apparatus 118 situated beneath the vacuum turntable 112. The vacuum generating apparatus 118 typically comprises a vacuum pump and a manifold connected to the vacuum pump for applying vacuum evenly across the entire diameter of the vacuum turntable 112. As will be appreciated by those skilled in the art, other types and kinds of vacuum generating apparatus may be utilized in the practice of the invention depending upon the requirements of particular applications thereof. The intensity of the vacuum that is applied to the vacuum turntable 112 is likewise dependent on the diameter of the vacuum turntable, the rotational speed at which the vacuum turntable is operated, and the types and kinds of wrapped bakery products which are handled by the vacuum turntable.

Referring particularly to FIGURES 3 and 4, the turntable 112 is driven by a motor 120. A pulley 122 is driven by the motor 120 and in turn drives a belt 124. The belt 124 extends entirely around the turntable 112 and functions to transfer operating power from the motor 120 to the turntable 112. The rotation of the vacuum turntable 112 is guided by a plurality of idler rollers 126 located at spaced intervals around the periphery of the turntable 112.

The use of the belt 124 to rotate the turntable 112 comprises an important feature of the invention. By means

of the turntable drive system of the present invention, the high torque loads which are typically imposed on turntable drive shafts are eliminated. Perhaps more importantly, by eliminating the typical turntable drive shaft, the space directly beneath the turntable is made available for the vacuum generating apparatus 118 which applies vacuum to the turntable without interference from the turntable operating mechanism. In this manner, the vacuum is supplied uniformly across the entire diameter of the turntable 112.

The upper surface of the turntable 112 which engages the wrapped bakery products comprises a perforated plate 132. The diameter of the perforations comprising the plate 132 is preferably between about .0337 inches and about .0340 inches. The spacing between the holes comprising the perforated plate 132 is preferably between about .2186 inches and about .2225 inches. The thickness of the perforated plate 132 is preferably about .020 inches, however, thicker plates can also be used in the practice of the invention, if desired. Those skilled in the art will appreciate and understand the fact that the precise dimensions comprising the diameters of the perforations, the spacing between perforations, and the thickness of the perforated plate 132 of the vacuum table 112 can be varied in accordance with the requirements of particular applications of the invention.

The vacuum turntable 112 performs two very important functions in the operation of the pattern former 100.

First, the vacuum turntable 112 decelerates individual wrapped bakery products comprising groups of wrapped bakery products which are moved onto the vacuum turntable 112 by the transfer apparatus 110. In this manner each wrapped bakery product comprising a group thereof precisely positioned on the vacuum turntable 112 without danger of the wrapped bakery product moving beyond its intended location due to inertia. The vacuum turntable 112 also functions to firmly retain the wrapped bakery products received thereon during rotation of the vacuum turntable 112 to form the desired pattern of wrapped bakery products. This is true even if the wrapped bakery products are positioned near the outer circumference of the vacuum turntable 112. Perhaps most importantly, the vacuum turntable 112 properly decelerates wrapped bakery products received thereon and subsequently firmly retains the wrapped bakery products during rotation with no damage to the bakery products or the wrapping thereof.

FIGURES 5-11, inclusive, illustrate the construction and operation of the apparatus 116 which transfers patterns of wrapped bakery products from the vacuum turntable 112 to bakery trays for transportation from the bakery to retail outlets. The apparatus 116 includes a housing 134 which encloses a drive belt 136. The drive belt 136 moves along a course defined by pulleys 138 and is driven by a motor 140. A traveler 142 is secured to the belt 136 for movement thereby along a substantially horizontal course

defined by slideways 144. The slideways 144 support the traveler 142 for movement under the action of the belt 136.

The traveler 142 supports a pusher plate 150 and a spanker plate 152. The pusher plate 150 is actuated by pusher plate cams 154 and the spanker plate 152 is actuated by spanker plate cams 156.

As is best shown in FIGURES 8, 9, 10, and 11, the pusher plate 150 is supported on a rod 160 which is pivotally supported on the traveler 142. A bell crank 162 extends from each end of the rod 160, and a cam follower 164 is supported at the distal end of each bell crank 162. The weight of the pusher plate 150 normally pivots the pusher plate 150 downwardly thereby pivoting the cam followers 164 upwardly and into engagement with camming surfaces comprising the lower surfaces of the pusher plate cams 154.

The pusher plate cam 154 include pivotally supported sections 166. As the pusher plate 150 moves away from the turntable 112 and toward the motor 140, the cam followers 164 engage the pivotally supported portions 166 which thereupon pivot upwardly allowing the cam followers 164 to continue in engagement with the lower camming surfaces of the pusher plate cams 154.

When the pusher plate 150 reaches the end of its travel away from the turntable 112 and toward the motor 140, the direction of movement of the belt 136 is reversed and the pusher plate 150 is moved in the opposite

direction, i.e., away from the motor 140 and toward the turntable 112. The cam followers 164 engage the pivotally supported portions 166 of the pusher plate cams 154 thereby causing the cam followers 164 to ride upwardly and into engagement with upper camming surfaces comprising the pressure plate cams 154. Engagement of the cam followers 164 with the upper camming surfaces of the pusher plate cams 154 pivots the pusher plate 150 upwardly into an orientation in which it extends parallel to the pusher plate cams 154. This allows the pusher plate 150 to pass over a pattern of wrapped baked goods which has been assembled on the vacuum turntable 112 as the pusher plate 150 was moving a previously assembled pattern off the turntable 112 and into a bakery tray.

The spanker plate 152 is supported on rods 172 which are sidedly supported in the traveler 142. The rods 172 extend to a bar 174 which in turn extends to cam followers 176 which engage the spanker plate cams 156. As will be appreciated by those skilled in the art, the spanker plate cams 156 allow the spanker plate 152 to move downwardly as the traveler 142 reaches the limit of its travel in the direction extending away from the vacuum turntable 112 and towards the motor 140. As the traveler 142 begins its reverse movement, i.e., away from the motor 142 and toward the vacuum turntable 112, the spanker plate cams 156 return the spanker plate 152 to the position illustrated in FIGURES 5-11, inclusive.

The operation of the transfer apparatus 116 of the pattern former 100 is illustrated in FIGURES 12-79, inclusive. A plurality of wrapped bakery products P are positioned on the vacuum turntable 112. A bakery tray T is positioned to receive the wrapped bakery products P. A slip sheet 180 extends from the vacuum turntable 112 into the bakery tray T. The pusher plate 150 extends downwardly and engages the wrapped bakery products P. Under the action of the motor 140 operating through the belt 136, the pusher plate 150 begins to push the wrapped bakery products P toward the bakery tray T.

FIGURES 12-42, inclusive, depict the movement of the wrapped bakery products P away from the rotary turntable 112 and into the bakery tray T under the action of the pusher plate 150. As will be appreciated by those skilled in the art, the wrapped bakery products P follow a sliding movement downwardly along the upper surface of the slip sheet 180 as the wrapped bakery products P enter the bakery tray T.

Referring particularly to FIGURES 43-53, the movement of the wrapped bakery products P into the bakery tray T under the action of the pusher plate 150 eventually causes the bakery tray T to move away from the vacuum turntable 112 thereby disengaging the slip sheet 180 therefrom. FIGURES 48-53 illustrate the pivotally supported portion 166 of the pusher plate cam 154 pivoting upwardly to allow the cam followers 164 to pass thereunder.

FIGURES 53-63, inclusive, illustrate the final portion of the movement of the wrapped bakery products P into the bakery tray T. The cam followers 176 eventually reach the end of the flat portions of the spanker plate cams 156 whereupon the spanker plate 142 is allowed to move downwardly. As will be appreciated by those skilled in the art, the spanker plate 142 is not forced downwardly, but instead moves downwardly under the action of gravity. The function of the spanker plate 152 is to assure that the last wrapped bakery product P comprising the pattern that was formed on the vacuum turntable 112 is fully seated in the bakery tray T. Simultaneously, the slip sheet 180 is fully disengaged from the bakery tray T as the bakery tray T moves away from the vacuum turntable 112 under the action of the pusher plate 150.

FIGURES 64-79, inclusive, illustrate the return movement of the traveler 142 and the apparatus carried thereby, that is, the movement of the traveler 142 away from the motor 140 and toward the vacuum turntable 112. As the cam followers 176 move into engagement with the inclined portion of the spanker plate cams 156, the spanker plate 152 is moved upwardly. As the cam followers 164 engage the pivotally supported portions 166 of the pusher plate cams 154, the pusher plate 150 is pivoted upwardly until it extends parallel to the belt 136.

Upward movement of the spanker plate 152 and upward pivotal movement of the pusher plate 150 allow the pusher

plate 150 and the spanker plate 152 to pass over a subsequent pattern of wrapped bakery products that was formed on the vacuum table 112 as the pusher plate was moving the previously formed pattern of wrapped bakery products into the bakery tray T. The fact that a pattern of wrapped bakery products can be moved into a bakery tray and a subsequent pattern of wrapped bakery products can simultaneously be formed on the vacuum table 112 comprises an important feature of the present invention which substantially increases the throughput rate of pattern formers incorporated in the invention.

Referring particularly to FIGURES 76-79, inclusive, when the cam followers 164 reach the ends of the upper surfaces of the pusher plates cams 154, the pusher plate 150 drop down under the action of gravity and returns to its original positioning. The spanker plate 152 remains in its raised orientation under the action of the engagement of the cam followers 176 with the spanker plate cams 176. FIGURE 79 illustrates the component parts of the apparatus 116 in their original orientation and ready to move a subsequent pattern of wrapped bakery products into a bakery tray.

The transfer apparatus 110 which moves groups of wrapped bakery products from the grouping apparatus 108 to the vacuum table 112 operates exactly the same as the transfer apparatus 116, the only difference being that the transfer apparatus 110 does not include a spanker plate.

The transfer apparatus 110 includes a pusher plate 182 which is mounted on a belt driven traveler constructed similarly to and functioning identically to the traveler 142 and which is activated by cams constructed similarly to and functioning identically to the cams 154. Thus, the apparatus 110 operates identically to the operation of the pusher plate 150 of the transfer apparatus 116 in that it is positioned in a downwardly extending, operative orientation as it moves groups of bakery products from the grouping apparatus 108 to the vacuum turntable 112, and is cammed upwardly into a horizontally disposed orientation as it moves in the reverse direction, that is, away from the vacuum turntable 112 and back toward the grouping apparatus 108. In this manner the pattern former of the present invention functions to arrange a subsequent group of wrapped bakery products on the grouping apparatus 108 as the pusher plate 181 is moving a previous group of wrapped bakery products onto the conveyor 112. The fact that the two operations occur simultaneously comprises an important feature of the pattern former 100 which substantially increases the throughput rate thereof.

Although preferred embodiments of the invention have been illustrated in the accompanying Drawings and described in the foregoing Detailed Description, it will be understood that the invention is not limited to the embodiments disclosed, but is capable of numerous rearrangements, modifications, and substitutions of parts

and elements without departing from the spirit of the invention.